



E-ISSN: 2321-2187  
P-ISSN: 2394-0514  
[www.florajournal.com](http://www.florajournal.com)  
IJHM 2020; 8(2): 14-18  
Received: 10-01-2020  
Accepted: 12-02-2020

**Soumya Saha**  
Netaji Subhas Chandra Bose  
Institute of Pharmacy, Tatla,  
Chakdaha, Nadia, West Bengal,  
India

**Jhuma Deb**  
Netaji Subhas Chandra Bose  
Institute of Pharmacy, Tatla,  
Chakdaha, Nadia, West Bengal,  
India

**Nilip Kanti Deb**  
Netaji Subhas Chandra Bose  
Institute of Pharmacy, Tatla,  
Chakdaha, Nadia, West Bengal,  
India

## Review on *Mirabilis jalapa* L., (Nyctaginaceae): A medicinal plant

**Soumya Saha, Jhuma Deb and Nilip Kanti Deb**

### Abstract

*Mirabilis jalapa* L. commonly known as Four O' Clock plant is a perennial herbaceous medicinal plant well known for its traditional uses. Conventionally, the plant is used in the treatment of a variety of human ailments like skin diseases, cathartic, purgative, stomachic, tonic, anti-dysenteric, anti-parasitic, wound healing properties, digestive, stimulant etc. The active constituents reported in this plant includes alkaloids, flavonoids, phenols, glycosides, tannins, saponins, lignin and carbohydrates. A number of pharmacological activities are reported in this plant like anti-diabetic, anti-inflammatory, anti-oxidative, anti-bacterial, anti-microbial, anti-fungal, anti-spasmodic, antinociceptive, anti-viral, diuretic, anthelmintic and urinary tract disorder. The present study is therefore aimed at providing a review of the literature on its ethnomedicinal, phytochemical and pharmacological properties.

**Keywords:** *Mirabilis jalapa* L., (Nyctaginaceae), ethnomedicinal, phytochemistry

### 1. Introduction

*Mirabilis jalapa* L. commonly known as Four O'clock plant (Nyctaginaceae) is a perennial herbaceous bushy plant which grows upto 1-meter height and just as wide [1]. It has numerous branches; leaves are Pointed, 5-10 cm long which are ovate and cordate. Tubers are large, black carrot shaped that can be a foot or more long. In warmer regions, the roots can weigh up to 40 lb. (18 kg.) or more. Stems are swollen at the nodes. Fruits are nut ellipsoid, rugose and single seeded. The fragrant flowers are borne singly or in clusters, and vary from red, magenta, pink, yellow or white, sometimes with more than one color on the same plant. Bicolor flowers are also possible. Individual flowers are trumpet shaped, about an inch across at the end and about two inches long. They open in the evening and wilt in the next morning. The plants continue to produce new flowers from late spring till fall [2, 3]. Flowers are subtended by an involucre of 5 ovate, connate bracts [4], striped or blotched [2]. Perianth is funnel shaped and 5-lobed. Stamens are 3-6 in numbers. Anthocarps are globose and black at maturity [4]. The black seeds are twice the size of pepper corn [1].



Flowers



Leaves

**Fig 1:** Morphology of different parts of *Mirabilis jalapa*.

**Corresponding Author:**  
**Soumya Saha**  
Netaji Subhas Chandra Bose  
Institute of Pharmacy, Tatla,  
Chakdaha, Nadia, West Bengal,  
India

### 1.1 Synonyms

The synonyms of *Mirabilis jalapa* are; *M. dechotoma* Lin. (In Brazil), *M. dechotoma* Lin. and *M. longiflora* Lin. (In tropical America), *M. lindheimeri* Lin. and *M. odorata* Lin. [5].

### 1.2 Taxonomic classification

Kingdom: Plantae;  
Sub kingdom: Tracheobionta;  
Division: Angiosperms;  
Class: Dicotyledons;  
Subclass: Caryophyllidae;  
Order: Caryophyllales;  
Family: Nyctaginaceae;  
Genus: *Mirabilis*;  
Species: *Jalapa* [5].

### 1.3 Common Vernacular Names

Bengal- Krishnakeli, Sarpamani, Sandhyamaloti.  
Gujrati- Gubbaji.  
Hindi- Gul-abbas.  
Sanskrit - Krishnakeli, Sandhykali.  
Tamil- Andhimalligai, Andhimandhaarai, Antinaralu,  
Patharachi [1, 3, 5, 6].

### 2. Geographical Distribution

*Mirabilis jalapa* Linn. (Family Nyctaginaceae) was officially botanically recorded in 1753 although it already had long been distributed as an ornamental plant throughout the tropics of the world. This plant is naturalized throughout the tropics of South America, Latin America, France and India. In India, grows mainly in West Bengal, Manipur, and Western Himalayas [6, 7].

### 3. Ethnomedicinal information

The whole plant as well as individual parts of *Mirabilis jalapa* Linn. used traditionally to cure a variety of human ailments. The Whole plant is extensively used for muscular pain, diarrhea, and abdominal colic by people from different countries [8]. The decoction of the entire plant is taken orally to treat kidney infections [9] for diuresis [1, 9]. The infusion of the leaves was applied topically to reduce swelling in bone fractures or twisting [9]. The leaves are used in inflammation, boils, Purgative and emetic properties [10]. The leaves are crushed and mixed with salt in Sprain and bruise [11]. The leaves are fried in clarified butter and are fastened on the abscess. Boiled Leaves are eaten to reduce body pains [12]. The Paste of leaves is used in amenorrhea and dysmenorrhea in women [13], Skin eruption and also has emollient property [14]. The leaf juice is taken orally for treatment of Hepatitis [15], [16]. The leaf juice is slightly warmed and used as poultice over abscesses which help in healing wounds. Leaf juice is used as eye drop to soothe eye inflammation [12]. The decoction of leaves is used for genitourinary system disorders, and treating injuries [17]. The Stem and leaves is used for depigmentation [18]. Leaves and roots are used medicinally in Ayurveda, Siddha and other traditional system of medicine for curing various ailments [3]. The decoction of the root and leaves can be used for treating pain and inflammation in arthritis [19]. Roots are used as aphrodisiac and good for syphilitic sores [7]. The root paste is applied for inflammation [20, 21]. The natives of Shivalik Hills, Himachal Pradesh uses the root tubers which are consumed as pickle for its nutritive value. The paste of the root tuber is applied to check the growth of old tumor in Tribal areas of Rajasthan [22]. Tuber is administered in minute quantities to cure piles [12]. The fruit paste made

with coconut oil is applied externally, for relief from Headache of folk as well as domestic animals at Bhadra Wild Life Sanctuary area in Karnataka [23]. Flowers are used in food coloring, an edible crimson dye is used to color cakes and jellies [3]. The inhabitants of Tehsil Kabal, Swat District, Pakistan, uses juice of the whole plant for relief from pain and also provides cure from typhoid [24]. Mexican people uses various decoctions and preparations for the treatment of dysentery [25]. In China, this plant has been used as traditional Chinese medicine and ethnic drug to treat diabetes [26]. It is reported that the powdered seed is used as a cosmetic powder by the natives of Japan [27]. In Latin America and South Africa, roots of *Mirabilis jalapa* L. were traditionally used for its purgative, emetic and cathartic properties [4, 28]. In Malagassy, *Mirabilis jalapa* plant was used to treat intestinal pains [28].

### 4. Phytochemistry

**4.1. Aerial parts:** Triterpenes, flavonoids, Beta-sitosterol, Stigmasterol, ursolic acid, oleanolic acid and brassicasterol are present in aerial parts of plant [29, 30].

**4.2. Roots:** The roots contain 3% resin, trigonelline, astragaloside-VI, flazin [31], 4'-hydroxy-2,3-dihydroflavone-7-beta-D-glucopyranoside, ginger glycolipid-A [32], 3,4-dihydroxybenzaldehyde, p- hydroxybenzaldehyde,  $\beta$ -sitosterol, daucosterol and Stigmasterol, proteins, rotenoids mirabijalone A, B, C [29, 30], 9-O-methyl-4-hydroxyboeravinone-B, boeravinone-C and F. 1, 2, 3, 4-tetrahydro-1-methyl isoquinoline-7, 8-di-diol, alkaloids, glycosides, carbohydrates, and phytosterols [33].

**4.3. Leaves:** The leaves contain Flavonoids, quercetin, D-pinitol, an *o*-methyl inositol present [34], C-glycosyl flavonoid Tricosan-12-one, *n*-hexacosanal,  $\beta$ - sitosterol, tetracosanoic acid tartaric acid, citric acid, leucine, valine, tryptophan, alanine and glycine polyphenolic amide N-trans-feruloyl-4'-O-methyldopamine [35, 36].

**4.4. Stems:** The aqueous and methanolic extract of stem shows the presence of large amount of alkaloids, carbohydrates, tannins, unsaturated hydrocarbon and flavonoids [36].

**4.5. Seeds:** A fatty acid was reported as a minor component in the seed oil and was designated as 8- hydroxy-octadeca-cis-11, 14-dienoic acid. Arginine, glycine, histidine, threonine, tyrosine, aspartic acid and glutamic acid. D-glucan, a polysaccharide from seeds cotyledons was reported to contain 38 glycosyl units.  $\beta$ -sitosterol,  $\beta$ -amyirin,  $\beta$ -sitosterol-D-glucoside and  $\beta$ -amyirin-3-O- $\alpha$ -L-rhamnosyl-O- $\beta$ -D-glucoside were also isolated from seeds [35, 37].

**4.6. Flowers:** Miraxanthins I-III, Miraxanthins IV, indicaxanthin, vulgoxanthin I and Betaxanthins were isolated from flowers [37].

### 5. Bioactivity

Few reports on the pharmacological activities on the plant are found in the literature.

#### 5.1 Antioxidant and cytotoxic activity

The aqueous, ethanolic and hexane extracts of tubers [38], seed epicarp extract [33], bark [39-40], shows anti-oxidant activity [41]. Methanolic extract exhibits anti-oxidant potential on both

roots and aerial parts. Methanolic extract of leaves exhibits significant anti-oxidant, anti-microbial and anti-fungal activity. The petroleum ether, chloroform and methanol crude extracts of the different plant parts (leaves root and bark) showed cytotoxic activity<sup>[42]</sup>.

### 5.2 Antidiabetic activity

The ethanolic extract of root shows antidiabetic activity<sup>[43-45]</sup>.

### 5.3 Anti-Microbial Activity

Alcoholic extract of leaf showed anti-microbial effect against *Pseudomonas aeruginosa*, *Salmonella typhi*, *Staphylococcus aureus* and *Bacillus subtilis*<sup>[46,47]</sup>.

### 5.4 Antifungal activity

The Methanol extracts showed antifungal activities against *Aspergillus niger*, *Candida albicans* and *Daedalea flavida*<sup>[48,49]</sup>.

### 5.5 Anti-inflammatory activity

The alcoholic, aqueous, pet ether extracts showed anti-inflammatory activity by carrageenan-induced paw edema, formalin-induced paw edema, cotton pellets induced granuloma models in Wistar albino rats<sup>[50,51]</sup>.

### 5.6 Anthelmintic activity

The methanolic extract of the aerial parts showed anthelmintic activity<sup>[52]</sup>.

### 5.7 Anti-tubercular drugs induced hepatotoxicity

Studies were carried on the anti-tubercular activity of *Mirabilis jalapa*. It was deduced that *Mirabilis jalapa* Linn. Leaves show a protective effect on hepatotoxicity induced by anti-tubercular drugs<sup>[53]</sup>.

### 5.8 Analgesic and Muscle Relaxant Activity

It is reported that ethanolic extract of the leaves of *Mirabilis jalapa* has analgesic and muscle relaxant activity on swiss albino mice<sup>[54]</sup>.

### 5.9 Anti-asthmatic Activity

It is reported that ethanol and acetone root extract have anti-asthmatic activity using a guinea pig tracheal chain preparation and clonidine-induced mast cell granulation in mice<sup>[55]</sup>.

## 6. Conclusion

*Mirabilis jalapa* L. is used traditionally to cure a variety of human ailments. The whole plant is extensively used for the treatment of muscular pain, diarrhea, inflammation, boils, Purgative etc. which are associated with a variety of phytoconstituents including triterpenes, flavonoids, alkaloids, carbohydrates, tannins etc. From the ethnomedicinal, Phytochemical and pharmacological review it may be concluded that this plant has an array of folk lore claims which needs to be scientifically validated. This will in turn lead to the discovery of new medicinal agents from *Mirabilis jalapa* L.

## 7. References

- Kurian JC, Mutatkar RK, Samraj E. Plants that heal. 1st ed. Pune, India: P.H. Lall, at and for the owners of Oriental Watchman Publishing House, Pune, 2003; 1:214-215.
- Krishnamurthi SA. The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products. Publ Inf Dir CSIR New Delhi. 1998; 6:392-393.
- Devi SL, Sunny M, Janapriya N, Nagamani S, Babu TS, Vinupriya S *et al.* Pharmacognostical and Phytochemical Studies of *Mirabilis jalapa* Linn. South Asian Journal of Biological Sciences. 2011; 1(1):1-6.
- Chetty K, Sivaji K, Rao K. Flowering Plants of Chittoor District, Andhra Pradesh, India. Stud Offset Print Tirupati India, 2008.
- Rozina R. Pharmacological and biological activities of *Mirabilis jalapa* L. International Journal of Pharmacological Research. 2016; 6(5):160-168.
- Nidavani RB, Am M. An Ethanopharmacological Review of Four O' Clock Flower Plant (*Mirabilis jalapa* Linn.). J Biol Sci Opin. 2014; 2(6):344-348.
- Kirtikar KR, Basu B. Indian Medicinal Plants-with illustrations. 2<sup>nd</sup> ed. Oriental enterprise publishers, 2001; 9:2824-2825.
- Holdsworth DK. A Preliminary Study of Medicinal Plants of Easter Island, South Pacific. International Journal of Pharmacognosy. 1992; 30(1):27-32.
- Sharma HK, Chhangte L, Dolui AK. Traditional medicinal plants in Mizoram, India. Fitoterapia. 2001; 72(2):146-161.
- Goleniowski ME, Bongiovanni GA, Palacio L, Nunez CO, Cantero JJ. Medicinal plants from the Sierra de Comechingones, Argentina. Journal of ethno pharmacology. 2006; 107(3):324-341.
- Boulogne I, Germosen-Robineau L, Ozier-Lafontaine H, Fleury M, Loranger-Merciris G. Tramil Ethno pharmacological survey in Les Saintes (Guadeloupe, French West Indies): a comparative study. Journal of ethno pharmacology. 2011; 133(3):1039-1050.
- Bhatia H, Manhas RK, Kumar K, Magotra R. Traditional knowledge on poisonous plants of Udhampur district of Jammu and Kashmir, India. Journal of Ethnopharmacology. 2014; 152(1):207-216.
- Sriithi K, Trisonthi C, Wangpakapattanawong P, Balslev H. Medicinal plants used in Hmong women's healthcare in northern Thailand. Journal of Ethnopharmacology. 2012; 139(1):119-135.
- Mahmood A, Mahmood A, Malik RN. Indigenous knowledge of medicinal plants from Leepa valley, Azad Jammu and Kashmir, Pakistan. Journal of ethno pharmacology. 2012; 143(1):338-346.
- Mahmood A, Mahmood A, Malik RN, Shinwari ZK. Indigenous knowledge of medicinal plants from Gujranwala district, Pakistan. Journal of ethno pharmacology. 2013; 148(2):714-723.
- Sharma J, Gairola S, Gaur RD, Painuli RM. The treatment of jaundice with medicinal plants in indigenous communities of the Sub-Himalayan region of Uttarakhand, India. Journal of ethno pharmacology. 2012; 143(1):262-291.
- Weckerle SC, Ineichen R, Huber KF, Yang Y. Mao's heritage. Medicinal plant knowledge among the Bai in Shaxi, China, at a crossroads between distinct local and common widespread practice. Journal of Ethnopharmacology. 2009; 123(2):213-228.
- Kamagaju L, Bizuru E, Minani V, Morandini R, Stévigny C, Ghanem G *et al.* An ethnobotanical survey of medicinal plants used in Rwanda for voluntary depigmentation. Journal of Ethnopharmacology. 2013; 150(2):708-717.
- Chen Y, Shi G, Gao F, Zhang Y, Zheng F, Chen P *et al.*

- Ethnobotanical Study of Medicinal Plants on Arthritis Used by Chaoshan in Guangdong, China. *Med Chem Los Angel Open Access Journal*. 2016; 6(12):715-723.
20. Sher Z, Khan Z, Hussain F. Ethnobotanical studies of some plants of Chagharzai valley, district Buner, Pakistan. *Pakistan journal of botany*. 2011; 43(3):1445-1452.
  21. Ghatapanadi S, Johnson N, Rajasab A. Documentation of folk knowledge on medicinal plants of Gulbarga district, Karnataka. *Indian journal of traditional knowledge*. 2011; 10(2):349-353.
  22. Swarnkar S, Katewa SS. Ethnobotanical Observation on Tuberous Plants from Tribal Area of Rajasthan (India). *Ethnobotanical leaflets*. 2008; 12:647-666.
  23. Parinitha M, Harish GU, Vivek NC, Mahesh T, Shivanna MB. Ethno-botanical wealth of Bhadra wild life sanctuary in Karnataka. *Indian journal of traditional knowledge*. 2004; 3(1):37-50.
  24. Ahmad I, Ibrar M, Barkatullah, Ali N. Ethnobotanical Study of Tehsil Kabal, Swat District, KPK, Pakistan *journal of botany*, 2011, 1-9.
  25. Dimayuga RE, Virgen M, Ochoa N. Antimicrobial Activity of Medicinal Plants from Baja California Sur (México). *Pharmaceutical biology*. 1998; 36(1):33-43.
  26. State Administration of Traditional Chinese Medicine, Chinese materia medica, in Editorial Board, Chinese Materia Medica (II), Shanghai Science and Technology Press, Shanghai, China, 1999, 748-749.
  27. AL B. The genera of Nyctaginaceae in the south eastern United States. *Journal of the Arnold Arboretum*. 1947; 55:1-37.
  28. Watt JM, Breyer-Brandwijk MG. The Medicinal and Poisonous Plants of South Africa. E Livingstone Lond. 1962; (2):801.
  29. Siddiqui S, Siddiqui BS, Adil Q, Begum S. Constituents of *Mirabilis jalapa*. *Fitoterapia*, 1990; 61(5).
  30. Siddiqui BS, Adil Q, Begum S, Siddiqui S. Terpenoids and steroids of the aerial parts of *Mirabilis jalapa* Linn. *Pakistan Journal of Scientific and Industrial Research*. 1994; 37:108-110.
  31. Shaaban M, Schroder D, Shaaban KA, Helmke E, Grün-Wollny I, Wagner-Dobler I *et al.* Flazin, Perlolyrin, and other  $\beta$ -Carbolines from marine derived Bacteria. *Revista Latinoamericana de Quimica*. 2007; 35 (3): 58–67.
  32. Gingerlycolipid A. The comparative toxic genomics database. [Internet]. [Cited 2009 May 25]. Available from: Available at <http://ctd.mdibl.org/detail.go?type=chem&acc=C089057>.
  33. Wang XH, Dai JT. Antioxidant Activities of *Mirabilis jalapa* L. Seed Epicarp Extract. In *Advanced Materials Research*. 2012; 550-553:1768-1772.
  34. The Merck Index, An encyclopedia of chemicals, drugs and biologicals. Thirteen editions. Merck Research Laboratories, 2001, 623-9770.
  35. Bielecki RL. Pinitol is a major carbohydrate in leaves of some coastal plants indigenous to New Zealand. *New Zealand Journal of Botany*. 1994; 32(1):73-78.
  36. Michalet S, Cartier G, David B, Mariotte A-M, Dijoux-franca M-G, Kaatz GW *et al.* N-caffeoylphenalkylamide derivatives as bacterial efflux pump inhibitors. *Bioorganic & medicinal chemistry letters*. 2007; 17(6):1755-1758.
  37. Dimayuga RE, Virgen M, Ochoa N. Antimicrobial Activity of Medicinal Plants from Baja California Sur (Mexico). *Pharmaceutical Biology*. 1998; 36(1):33-43.
  38. Hajji M, Jarraya R, Lassoued I, Masmoudi O, Damak M, Nasri M *et al.* GC/MS and LC/MS analysis, and antioxidant and antimicrobial activities of various solvent extracts from *Mirabilis jalapa* tubers. *Process Biochemistry*. 2010; 45(9):1486–1493.
  39. Rumzhum NN, Rahman MM, Islam MS, Chowdhury SA, Sultana R, Parvin MN *et al.* Cytotoxicity and antioxidant activity of extractives from *Mirabilis jalapa*. *Stamford Journal of Pharmaceutical Sciences*. 2008; 1(1):85-88.
  40. Aher AN, Kavita B, Sunanda M, Shubhangi B. Pharmacognostic, Phytochemical and Pharmacological Investigation on Leaf and Root of *Mirabilis jalapa* Linn (Nyctaginaceae). *International Journal of Pharmaceutical Sciences Review and Research*. 2016; 40(2):132-136.
  41. MS Dharan B, Boopathi, Alagappan, Premanand, Mohsin. Studies on anti-oxidant potency and in-vitro anti-bacterial efficacy of *Mirabilis jalapa* on enteric pathogens. *International Journal of Genetic Engineering and Biotechnology*. 2010; 1(3):193-198.
  42. Oladunmoye MK. Antioxidant, free radical scavenging capacity and antimicrobial activities of *Mirabilis jalapa*. *Journal of Medicinal Plants Research*. 2012; 6(15):2909-2913.
  43. Sarkar P, Mahmud AK, Mohanty JP. Anti-diabetic activity of ethanolic extract of *Mirabilis jalapa* roots. *International Journal of pharmacy and Technology*. 2011; 3(1):1470-1479.
  44. Zhou J-Y, Zhou S-W, Zeng S-Y, Zhou J-Y, Jiang M-J, He Y *et al.* Hypoglycemic and Hypolipidemic Effects of Ethanolic Extract of *Mirabilis jalapa* L. Root on Normal and Diabetic Mice. *Evidence-Based Complementary and Alternative Medicine*, 2012, 1-9.
  45. Sadiq ME, Abubakar AL, Abubakar HY, Adio H. Treatment with methanol root extract of *Mirabilis jalapa* suppresses postprandial hyperglycemia and dyslipidemia in diabetic rats. *Nigerian Journal of Basic and Applied Sciences*. 2018; 26(2):59-66.
  46. Akintobi OA, Agunbiade SO, Okonko IO, Ojo OV. Antimicrobial evaluation and phytochemical analysis of leaf extracts of *Mirabilis jalapa* against some human pathogenic bacteria. *Natural Sciences*. 2011; 9:45-53.
  47. Dimayuga RE, Virgen M, Ochoa N. Antimicrobial Activity of Medicinal Plants from Baja California Sur (Mexico). *Pharmaceutical biology*. 1998; 36 (1): 33–43.
  48. Kakad SL, Dhembare AJ, Ruchita C. Evaluation of antifungal activities of some selected plant species against fungal pathogen. *Journal of Microbiology and Biotechnology Research*. 2015; 5 (1): 24-27.
  49. Mohammed MT. Study of Some *Mirabilis jalapa* L. Leaves Components and Effect of their Extracts on Growth of Pathogenic bacteria. *Al-Mustansiriyah Journal of Science*, 2012; 23(6).
  50. Singh M, Kumar V, Singh I, Gauttam V, Kalia AN. Anti-inflammatory activity of aqueous extract of *Mirabilis jalapa* Linn. Leaves. *Pharmacognosy research*. 2010; 2(6):364-367.
  51. Nath LR, Manjunath KP, Savadi RV, Akki KS. Anti-inflammatory activity of *Mirabilis jalapa* Linn. Leaves. *Journal of Basic Clinical Pharmacy*. 2010; 1(2):93-96.
  52. Zachariah SM, Viswanad DN, Jaykar B. Free radical scavenging and antibacterial activity of *Mirabilis jalapa* Linn using *in vitro* models. *Asian journal of pharmaceutical and clinical research*. 2012; 5(3):115-120.
  53. Jyothi B, Mohanalakshmi S, Anitha K. Protective effect of *Mirabilis jalapa* leaves on anti-tubercular drugs

- induced hepatotoxicity. Asian journal of pharmaceutical and clinical research. 2013; 6(3):221-224.
54. Bharali D, Saha D. Preliminary Phytochemical Screening and Evaluation of Analgesic and Muscle Relaxant Activity of the Ethanolic Extract of the Leaves of *Mirabilis jalapa*. International journal current pharmaceutical research. 2017; 9(5): 81-84.
55. Maxia A, Sanna C, Salve B, Kasture A, Kasture S. Inhibition of histamine mediated responses by *Mirabilis jalapa*: confirming traditional claims made about antiallergic and antiasthmatic activity. Natural Product Research. 2010; 24(18):1681-1686.